



Section B: Detailed Project Information (15-page limit, excluding Exhibits)

- 1. Project Description:** Describe the need for the project(s), its basic design features, and what it will accomplish. Include an assessment of the current condition of all water facilities relating to the project. If the project(s)'s current scope differs from what is described in the letter of interest, please explain.

The Accelerated Gravity Sewer Assessment and Rehabilitation project includes the high consequence of failure portions of the gravity sewer system located in the top 20% of wastewater pumping stations basins deemed to be most problematic. The project scope spans sixty-five wastewater pumping station basins including over 900,000 feet of gravity mains of which forty-four percent were considered to have a higher consequence of failure. The system consists of 8" to 24" diameter gravity mains of which 95% are PVC pipe and the balance is clay pipe.

The gravity sewer piping and manhole repairs will use trenchless technologies and open cut removal/replacement. Use of trenchless technologies such as cured-in-place pipe (CIPP) liners and manhole coatings benefit the public due to less invasive repairs, more timely improvements, and less impacts to residents and businesses within the work limits.

Project evaluation area for improvements consists of approximately:

- 75 miles of cleaning and CCTV
- 17 miles of cured-in-place piping (CIPP) lining for 6" to 24" diameter mains
- 8 miles of gravity sewer replacements for 8" to 24" diameter mains
- 450 manhole replacements
- 312 manhole rehabilitations/coatings
- Approximately 8,240 manhole inspections (> 10 feet deep)

The full scope of work for the removal, replacement and rehabilitation phase of the project will be identified after reviews are performed and recommendations are made for the assessment phase of the project. The assessment phase of the project is currently underway.

This Project addresses multiple purposes; it will prevent an increasing number of emergency sewer failures and reduce the social, environmental and financial impacts associated with emergency repairs versus planned remediation. Additionally, the Project will reduce inflow and infiltration into the gravity sewer system which, in turn, will effectively increase treatment capacity available for growth without expanding the treatment facility capacity.

Emergency repairs have a greater impact on the community (road closings, detours, damage to property) and potentially the environment (sanitary sewer spills that may reach the headwaters of the Florida Everglades) than do planned remediation projects. Accordingly, TWA has proactively worked towards the rehabilitation and repair of existing infrastructure in disrepair by evaluating rehabilitation project funds used for emergency repairs.

A study of the remediation and emergency repair projects completed over the last three years showed the average unit cost for emergency repairs to be almost 10 times greater than planned remediation projects. This has resulted in an increasing reallocation for funds otherwise designated for planned remediation work to emergency repair work. From 2015 through 2017, the cost of emergency sewer repairs grew from 37%, to 71%, to 88%, respectively each year diverting funding



from planned remediation as discussed in the Background above. Thus, TWA is actively pursuing an aggressive rehabilitation program to minimize the escalation of repair costs once they become emergencies.

2. **Location:** Describe the location of the project(s) and attach a map as Exhibit IV. Include the name(s) of the counties that the project(s) will serve.

The Project is largely situated in the center of the area served by TWA. Areas within the northern portion of the Project scope are comprised of some of the oldest portions of the areas served by TWA in the City of Kissimmee. Areas within the southern portion of the scope in unincorporated Osceola and Polk counties are comprised of several smaller privately-owned systems that were acquired by TWA that have inherent problems due to construction quality.

Exhibit IV includes a base map of the Project, and web map layers of the Project.

3. **Construction Plans and Specifications:** Attach the construction plans and specifications (with P.E. stamp, if available) for the project(s), including, but not limited to, construction drawings, specifications, construction contract forms, bidding instructions, etc., as Exhibit V. For alternative project delivery methods (i.e., design-build, construction manager at-risk, design-bid-build), include contractor selection materials such as Request for Qualifications and Request for Proposals. Draft materials are acceptable for the initial application. However, it is expected that final materials will be available for review and approval prior to the obligation event for the loan.

The project is a removal/replacement or rehabilitation project for existing gravity sewer mains, laterals and manholes within existing rights-of-way or easements owned by the Authority. Other than the restoration requirements for open cut work for the various jurisdictional locations, the projects are similar in nature.

Plans and specifications for priority repairs to Oakwood Drive were transmitted to EPA previously for review and are similar in nature to the future plans and specifications for the rehabilitation projects. The plans and specifications For Oakwood Drive, Robert McLane Boulevard and San Remo are included in **Exhibit V** for further review.

4. **Estimated Project Cost:**

- a. Provide a detailed cost estimate for the project(s). Distinguish between total and eligible project costs. Describe any costs or activities that may not be WIFIA-eligible.

The estimated total eligible costs of the Project are \$61,800,000. The requested WIFIA loan is 49% of the eligible Project costs, or \$30,300,000. It is anticipated that all project costs will be WIFIA eligible. Please see the cost breakdown below under 4b.

- b. For eligible project costs, provide an activity breakdown, as applicable, for: development-phase activities; construction, rehabilitation, and replacement activities; the acquisition



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WIFIA Program
Application

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of real property or an interest in real property, environmental mitigation, construction contingencies, and acquisition of equipment; and capitalized interest, reasonably required reserve funds, capital issuance expenses, and other carrying costs during construction. Include other cost categories as necessary.

Activity Breakdown for Use of Funds:

Use of Funds	Amount (\$)
Preliminary Evaluation	\$ 375,000.00
CCTV Cleaning	\$ 1,200,000.00
CCTV Evaluations/Recommendations	\$ 650,000.00
Surveying/SUEs	\$ 575,000.00
Preliminary Design/Engineering	\$ 975,000.00
Final Design/Engineering	\$ 1,950,000.00
Permitting	\$ 250,000.00
WIFIA Issuance Fees	\$ 400,000.00
Construction/Construction Administration	\$ 54,925,000.00
Contingency	\$ 500,000.00
Total	\$ 61,800,000.00

- 5. Project Schedule(s):** Provide a timeline(s) that illustrates the estimated start and completion dates for each major phase or milestone of project development, construction, and/or acquisition. Indicate the applicant's current status on this timeline.

Work Phase	Date Start	Date Complete
Preliminary Design Report (Phase 1)	1/1/2016	4/1/2017
CCTV-Condition Assessment Program	4/1/2019	10/1/2019
Preliminary Design Report (Critical/Priority Areas)	7/1/2019	12/1/2019
Detailed Plans/Specs-Critical Repairs/High Priority Mains	6/1/2018	6/1/2023
Permitting (ROW Use/MOT by Contractor)	6/1/2018	6/1/2019
Construction- Critical Repairs/High Priority Mains	11/18/2018	12/1/2024

6. Alternatives Analysis:

- a. If an alternatives analysis or business case analyses was not provided in the letter of interest, provide documentation of such analysis.

TWA initiated a program to rehabilitate and/or replace existing wastewater gravity sewer mains and water mains found to be in poor condition. As part of the gravity sewer main effort, TWA has been performing CCTV sewer inspections since 2012 covering a majority of their Downtown and Poinciana service areas.

Thus far, TWA has accumulated approximately 540,000 feet of gravity main and 2,260 manhole inspections covering 21 separate pump station tributary areas. In August 2016, TWA contracted with Tetra Tech to review the inspections and provide recommendations



for rehabilitation or replacement of the gravity sewers and adjacent water mains. During spring/summer 2019, further CCTV inspection is being conducted and a report will be generated in fall 2019 with the results and recommendations for repair and replacement to work in concert with the previous report developed.

The preliminary design analysis from 2017 was submitted as part of the LOI. It is included again in **Exhibit VI** for further review.

- b. Describe in detail the alternatives available, including the discussion of a “no action” alternative. The number and types of alternatives depend upon the scope and complexity of the project.

The Preliminary Design Report (PDR) from April 2017 included an evaluation of gravity main and manholes. The review and scoring were completed utilizing National Association of Sewer Service Companies Pipeline Assessment Certification Program (NASSCO PACP) to understand the severity of defects and define the approach of each pipeline review. PACP grading is a uniform method of coding common defects observed in sewer pipelines. These defect observations are made in the field and software assigns scoring to the defects. Each asset’s review and score prompted the recommendation by the engineer for no action, clean, spot repair, line, replace, or other (describe with comments). Further detail on how the assets were scored and the potential recommended options are found starting on pages 138, Appendix B-TWA Sewer System Inspection Repair Recommendation Guide in the PDR.

- c. Use a minimum planning period of five (5) years, and a maximum planning period not to exceed the useful life of the project.

The preliminary design report was finalized on April 24, 2017. The WIFIA letter of interest was submitted in July 2018 and TWA is submitting the WIFIA application during June 2019. Additional CCTV study is ongoing during 2019 as part of the project planning, however, we anticipate planning to complete in late 2019 and design plans to be prepared during 2019 and 2020. By the time the project moves forward to loan closing, the planning phase is anticipated to be complete and efforts focused on design and shortly thereafter, construction. We anticipate all construction will be complete within five-years of loan closing.

- d. Describe the rationale (i.e., lowest capital cost, greater ease of operation, most reliable, fewest environmental impacts, etc.) for the selected alternative. This rationale should include the technical, managerial, financial, environmental, operational, and local decision-making approaches.

The project includes multiple methods of rehabilitation and replacement of collection lines and manholes. The PDR discusses the rationale for the recommendations for each project area.

- e. Provide any referenced documents as Exhibit VI.

The April 2017 PDR is included in its entirety for further review in **Exhibit VI**.



- 7. System Engineer's Report(s):** If available and developed within the past five (5) years, provide the independent engineer's report(s), bond engineer's report(s), system master plan(s), or any other like document(s). Summarize the primary conclusions of the report(s) and indicate how the proposed project(s) fits into the long-term planning of the system. Include any applicable report(s) as Exhibit VII.

TWA initiated a program to rehabilitate and/or replace existing wastewater gravity sewer mains and water mains found to be in poor condition. As part of the gravity sewer main effort, TWA has been performing CCTV sewer inspections since 2012 covering a majority of their Downtown and Poinciana service areas. Thus far, TWA has accumulated approximately 540,000 feet of gravity main and 2,260 manhole inspections covering 21 separate pump station tributary areas. In August 2016, TWA contracted with Tetra Tech to review the inspections and provide recommendations for rehabilitation or replacement of the gravity sewers and adjacent water mains. This initial PDR was completed in April 2017 and is included in **Exhibit VI**. Additional CCTV inspections commenced during spring 2019 to prioritize additional rehab and replacement of collection lines. A PDR for the new, additional inspection work will be available and provided upon completion during fall 2019.

Recommendations provided for TWA in the April 2017 PDR include a combination of trenchless sewer rehabilitation and open cut replacement techniques, as well as water main replacement. The recommendations for the individual lift station areas are presented in the recommendation maps provided in Appendix A of the PDR. Table 4-1 of the PDR summarizes the capital costs for the recommended improvements. Each lift station area has varying amounts of each type of work to be completed. The recommendations for each area include suggestions for developing construction projects such as which areas are entirely comprised of trenchless construction, where there is open cut construction, and if there are any project sequencing constraints.

The benefits of trenchless rehabilitation of these gravity sewers include:

- Minimizing additional project design efforts needed, i.e. full survey is not required for bidding projects.
- Reducing or eliminating any excavation or pavement disruption.
- Limiting inconvenience to customers and their neighborhoods during construction.
- Cost savings compared to open cut replacement.

In areas where open cut excavation is required to complete the sewer repairs, adjacent water mains were evaluated to optimize the efficiency of the construction efforts by completing the water main replacement concurrent with the sewer work.

As discussed, the 2017 PDR has been included in **Exhibit VI**. For additional supporting documentation, the TWA Water and Wastewater Master Plan from February 2012 is included in **Exhibit VII**.

- 8. Environmental Review:** Summarize the status of the project(s)'s environmental review. Specifically, discuss whether the project(s) has prepared a draft Environmental Assessment, draft Environmental Impact Statement, or other Environmental Information Documents (including applicable cross-cutter coordination and consultation) in accordance with the National Environmental Policy Act. A Categorical Exclusion determination, Finding of No



Significant Impact, or Record of Decision will be required prior to execution of the credit agreement with EPA.

The Project infrastructure is within developed areas such that an environmental review plan is not required. Right-of-Way (ROW) use permit approvals, maintenance of traffic approvals and dewatering permit approvals are typically required for all work within the various jurisdictional limits and for open cut installations, respectively. TWA requests a Categorical Exclusion for the project based on the replacement nature of the work to be conducted.

A call was held on April 25, 2019 to discuss the engineering and environmental aspects of this replacement project. It was agreed that TWA would prepare a web map that shows all lines being assessed for rehab or replacement. This layer was also looked at in coordination with cultural resources mapping information provided by EPA. TWA submitted the web map and further information in the EPA portal on May 2, 2019. We await further comment from EPA regarding information needed to consider a Categorical Exclusion of the rehabilitation and replacement project.

9. Floodplain Management Plan: If the proposed project will be located in or will affect a floodplain as defined in Executive Orders 11988 as amended, provide a floodplain management plan that will describe how the project will meet or exceed applicable State, local, Tribal, and Territorial standards for flood risk and floodplain management, as well as Executive Orders [11988](#) and [13690](#); the [Federal Flood Risk Management Standard](#) (FFRMS); and the [Guidelines](#) for Implementing Executive Order 11988, Floodplain Management, and Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input.

The Project evaluation area includes existing assets in the flood zone. The table below illustrates the breakdown of gravity main and manholes that currently exist in the flood zone.

WIFIA ASSETS IN THE FEMA FLOOD ZONE

	Gravity Main (Linear Feet)	Manhole (Count)
In Flood Zone	45,714	159
All Assets	355,766	1,587
% of Assets in the Flood Zone	13%	10%

If manholes and piping are identified during the evaluation phase of the project as requiring rehabilitation, locking manhole rings and covers will be provided. It is not currently known if items within the floodplain limits will require any improvements. TWA has had Tetra Tech reach out to US Foundry who provides their rings and covers, and a locking manhole can be produced by them upon request within little to no time delays in the production of the locking covers.

10. Other Permits and Approval: List all other major permits and approvals necessary for construction of the project(s) and the date, or projected date, of the applicant's receipt of such permits and approvals. The list should include permits and approvals required under local, regional, State, and Federal laws and regulations. In particular, indicate when outstanding



approvals by State or local government entities are expected. Copies of major permits and approvals will be required upon execution of a credit agreement with EPA.

Right-of-Way (ROW) Use permit approvals and dewatering permit approvals are typically required for all work within the various jurisdictional limits. Both open cut/trench and trenchless rehabilitations require ROW Use Permit approvals with maintenance of traffic (MOT) plans submitted for the various work efforts. No wastewater permits are required for the Florida Department of Environmental Protection (FDEP) as the system modifications are for existing systems in-place and no relocations or other modifications are being performed.

- 11. Project Management and Compliance Monitoring Plan:** Provide a comprehensive project management and monitoring plan that will demonstrate the applicant's ability to deliver the project(s) as planned, fulfill all project commitments, and ensure compliance with all terms of the credit agreement, including all applicable regulations and provision of law. The plan should provide: (a) information on the roles and responsibilities of all entities with decision making authority for the project(s); (b) status reporting processes that document not only the status but changes and potential risks; and (c) coordination processes that provide for advance notification of potential issues to all appropriate agencies and timely resolution.

(a) Roles and Responsibilities

Responsibility for project management and compliance will ultimately be that of the Project Manager. Robert Pelham, Director of Engineering Services, is the Project Manager for this project. Designees will be assigned specific project responsibilities throughout the phases of this project and will fulfill these responsibilities under the direction of the Project Manager.

All work associated with this project, along with WIFIA specific requirements, will be formally defined and awarded. The process followed to define, and award work is outlined in the TWA Procurement Manual.

(b) Status Reporting Processes

The high-level phases associated with this project include: condition assessment/data collection; analysis and design and construction. The controls in place for each of these phases are referenced below.

Condition Assessment / Data Collection: Bid specification utilize TWA's standard front-end documents that include a description of the work to be performed, deliverable requirements, application for payment and progress reporting processes. NASSCO standards are specified to ensure consistency in methods, interpretation of field observations and delivery of the information. Biweekly meetings are scheduled to monitor progress and identify issues. The application for payment process will ensure that the work has been completed and can be used to support the Analysis and Design phase. TWA has entered into an agreement with one of our continuing consultant organizations to manage this phase of the project.

Analysis and Design: A scope of work detailing the work to be performed and preliminary deliverable requirements was awarded to one of TWA's continuing consultant



organizations. The use of the NASSCO standards for pipeline and manhole assessment certification as well as developed decision matrices to guide rehabilitation recommendations ensure consistent recommendations in the preliminary design report. Progress through this phase will also be managed through the application for payment process and progress meetings. The preliminary design report will be used jointly by TWA and the consultant to aggregate the recommendations into discreet projects.

Construction: The discreet projects will be publicly advertised and awarded through bid specifications utilizing TWA's standard front-end documents that included WIFIA specific requirements, a description of the work to be performed, acceptance requirements, warranties, bonding requirements, application for payment and progress reporting processes. A staff engineer, or augmented staff will be assigned to each construction project as project engineer. The project engineer will be responsible for monitoring the progress of the project and coordinating with the necessary parties to resolve questions or issues. This activity will be supported, but not totally provided, through regular project status meetings. When deemed appropriate, TWA inspectors will provide oversight of key field activities to ensure compliance with specifications. CCTV will be utilized to validate that replaced or rehabilitated infrastructure conforms to specifications. Additionally, an outside organization will be utilized to ensure compliance to the WIFIA specific requirements including but not limited to NEPA, Davis-Bacon and American Iron and Steel.

Potential changes for priority and critical rehab projects will be identified once the CCTV data is reviewed and associated updates will be presented such that costs, work areas and design packages can be grouped to maximize funding. Significant changes will be communicated as the design development stages progress and costs will be updated accordingly. Risks will be minimized with focusing on high priority and critical areas and identifying rehabilitation work that can be identified as alternate work with annual monitoring such that system failures or other risks are not encountered.

(c) Coordination Processes

The program includes a very large number of individual assets to be tracked, and accurate documentation is a large component of success. In order to ensure that the projects generated through this effort meets the program requirements, the project management plan will leverage the GIS database. The following list indicates the steps that will be taken during the program to ensure compliance.

- The project scope of work is based on lists generated by the GIS database for gravity main and manhole assets. TWA prioritized which assets were to be selected for review through an internal process that identified project areas through a combination of lift station operational data and repair work orders. These lists represent the initial program scope for inspection.
- During field work and data collection, the database will be provided to the contractor performing the work, providing them with locations and correct identification information, which will reduce possibility for data entry errors. Assets that cannot be located in the field were scoped in advance of the project and were uncovered by TWA to reduce lost time in searching for potentially buried manholes.



- All field work data deliverables will be checked, not just for compliance in report and database format, by the consulting engineer, but also for accuracy of PACP and MACP coding. Deficiencies in reporting and defect coding will be immediately communicated to the contractor which will provide revised database deliverables and take steps to avoid future problems with submittals.
- The consulting engineer will perform a complete review of all sewer and manhole investigations. The engineering efforts will include both an analysis of the pipe coding scores, and detailed review of defects which initial a repair recommendation to ensure that the proposed solution is correct, feasible and cost effective. All work will be completed by PACP and MACP trained engineers. PACP and MACP database information will be loaded into a web-based tool that utilizes a copy of TWA's GIS map. This tool will allow design engineers to be able to navigate individual lift station areas while simultaneously reviewing the inspections to consider the surrounding environmental impacts of the proposed work. Visual representations of both the defects and the proposed repairs assist in evaluating the impacts of the overall project.
- Work recommendations will be reviewed by a senior professional experienced in the design and construction of collection system open cut and trenchless construction techniques. This analysis will confirm that the appropriate repair recommendations are being applied, and that the proposed repairs are sequenced properly to meet the Authority's construction standards. Accepted work will then be documented in a preliminary design report (PDR) which will detail specific information related to the different types of repair work proposed in each lift station area, and which projects that work will be included with. Each list station area will also include a list of any alternative repair methods that may be available, including engineer's opinion of estimated costs.
- The PDR will be reviewed by TWA to select alternates and confirm project scope and limits. A meeting will be held with the consulting engineer where the results of the PDR will be used to assemble different construction packages to most efficiently approach the repair work. Considerations will be made based on the type of repair work to be done (standard open cut vs. specialty trenchless), and in some cases by location, to meet certain jurisdictional construction requirements. There may also be areas that require significant excavation, dewatering or traffic control which may raise the level of difficulty. TWA will have the final decision on which scoped gravity mains and manholes are included in proposed projects.
- Detailed engineering design work will follow the construction and restoration standards of both TWA and any additional local agencies with jurisdiction over the area the infrastructure is located. Construction plans, and specifications will be submitted to all local authorities and utility owners for review and comment during the preliminary portion of design for incorporation into the contract documents. Construction plans will utilize the same unique labeling assigned to the gravity main and manhole assets in the GIS. This will assist in documentation of work being included in each project, as well as in calculating project quantities.
- Measurement and payment specifications will be detailed such that the repair work includes provisions for inspection and documentation of all repairs by completing pre- and post- construction PACP and MACP compliant inspections that can be loaded into TWA's database upon project completion. The databases and videos submitted with each post-construction data deliverable will be reviewed to confirm the repair was successful and in accordance with all project specifications.



- Upon completion of the construction project, each gravity main and manhole inspected as part of the project will be marked as having proposed work to be completed, and which project the work will be included in as well as the date of last cleaning. When this information is loaded into TWA's database, it will immediately be reflected visually, which can then be used by TWA during the course of the project in order to avoid duplicating resources, and/or focusing too many resources on the same defect.
- Upon completion of the construction project, TWA will then have an updated GIS database that reflects the most recent inspection date, the date of the repair, and a recommendation for the next inspection. The inspection results will also be loaded to TWA's files as a record of the condition of the given asset at that point in time. Post-construction videos and reports will also be loaded so that repair history can be tracked over time.

For the plan above to work properly, it is imperative that all parties involved take care to provide accurate information in what is modified for the data that is extracted from TWA's database so that the correct information can be associated at the end of the project. All changes will require advanced notifications to regulatory agencies as the work must have approved ROW Use and MOT permits prior to commencement.

12. Risks and Mitigation Strategies: Identify risks to the project completion and sufficiency of revenues. Sample risks might include construction schedules, cost escalation, approvals, and litigation. Identify any mitigation strategies and proposed cost-containment approaches (*e.g.*, design-build, value engineering, guaranteed maximum price and/or completion date, warranties, or other incentive/disincentive clauses).

Potential risks which can subsequently create time and financial impacts to this project include: Construction schedules, escalation of construction costs, right-of-way use permitting timelines, public involvement issues and contractor coordination. Potential mitigation strategies for these items are as summarized below:

Construction schedules are of critical importance for this project. All bid packages will be qualifications based such that competent, qualified and larger construction contractors are among the pool of bidders. This will ensure that the contractors have the knowledge, experience and expertise to handle large-scale removal and replacement and rehabilitation projects. In addition, it will ensure they have the crews and manpower required to meet construction deadlines and to keep the projects on track. Another mitigation strategy is to inform many of the contractors who have been doing on-going work within TWA's limits that this project is coming in the near future, request they keep an eye out for it, and balance their workloads as it comes closer to the time of bidding.

Once awarded, project progress will be monitored on an ongoing basis. This monitoring will be centered around a fully loaded construction critical path method-based schedule. Regular submittals of this schedule, updated to reflect project progress, will be reviewed at the project status meeting. A formal process of managing project scope, including but not limited to change requests, request for information, schedule of values and applications for payment, will be used to manage the schedule, anticipate constraints and minimize impacts to the construction schedule. As an additional safeguard to schedule delays, liquidated damages will be defined as part of any awarded scope. These will be set at a level so that they act as a deterrent to schedule drift.



Escalation of construction costs are somewhat unavoidable as labor, material and equipment costs continue to rise yearly. However, there are ways to address this issue and to take advantage of the large amount of work proposed with this project and ways to manage the escalation of costs such as; preparing construction plan documents for larger work areas such that there is a 'scale of economy' for each work type or by grouping the bid packages to include those which are primarily lining or primarily open cut packages for which the contractors can self-perform the work and reduce sub-contractor mark-ups and costs.

TWA has an ongoing rehabilitation program that will continue beyond the project identified for WIFIA funding. This fosters the development of professional relations that tend to dampen spikes in variable construction costs. TWA will continue to leverage these relationships as well as its competitive bidding process to minimize the escalation of construction costs.

Right-of-Way (ROW) Use permitting timelines are dependent on the jurisdictional regulatory agencies' staff and workloads. A mitigation strategy to reduce lengthy ROW use/MOT permitting timelines for the work effort is to have pre-application meetings with the various jurisdictional agencies and to make them aware of pending submittal timelines for work within their areas. In addition, we will provide them with a copy of our webmap showing the potential work areas such that their future capital improvement work, roadway improvements, and other potential projects can be coordinated effectively. This will also reduce **public involvement** issues as the same area will not be restored only to be impacted again due to multiple scheduled projects that were not properly cross-coordinated.

Public involvement issues can escalate quickly and impact project timelines if not addressed in a timely fashion. A mitigation strategy is to provide the work area webmap to TWA's public involvement staff such that they are aware of the work limits. In turn, TWA will consider the appropriate channel of communication (door hangers, social media, press release) to ensure that the affected public is notified. This internal/external focus of communication will ensure that when a resident or business complaint comes in, the notified party can reach out to TWA's Project Manager immediately to notify the associated contractor of the issue and provide a timeline for resolving the complaint or providing it to the necessary and responsible party to address.

Contractor coordination is critical with multiple work areas that may overlap, have varying MOT phases and overlapping MOT limits and when there are multiple contractors, sub-contractors and crews performing the work. A mitigation strategy to reduce these issues is to hold regular progress meetings with the various contractors, the jurisdictional staff having authority over the ROW limits, and TWA such that everyone is aware of the various project limits and work within these limits.

A cost-containment approach which has previously been implemented by the Authority also includes identifying potential work alternative(s) subject to CCTV data review and evaluations, for which the work can be bid as an alternate, the potential costs and cost savings identified, and the actual work can then be timed as necessary.